

## LESSON TEN

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# MARKET OR COMMAND: Which Is Best for the Environment?

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### INTRODUCTION

The profit motive of market economies is often cited as the source of environmental pollution. Yet the opening of former Soviet republics has revealed environmental conditions that in many respects are worse than those seen in market economies. As these nations move toward market economies, the question often asked is, "Will environmental conditions improve or simply get worse?" This lesson focuses on the real source of environmental problems in both systems — ignoring opportunity costs.

### CONCEPTS

Opportunity Cost

### OBJECTIVES

- ◆ Define and identify opportunity costs
- ◆ Describe the importance of costs in making decisions
- ◆ Explain how ignoring some costs leads to environmental problems in both command and market systems

### LESSON DESCRIPTION

Members of the class play the roles of entrepreneurs in a market economy and managers in a command economy. They make decisions about how to make their product, widgets, given information on cost and availability of the resources used to produce widgets. The effect of ignoring opportunity costs in both systems is discussed.

### TIME REQUIRED

- ◆ One class period

### MATERIALS

Transparencies of Visuals 1, 2, and 3  
Copies of Activity 1 to provide role cards for each student

### PROCEDURE

Teacher preparation: Familiarize yourself with the table in Visual 1 and the various scenarios described on the role cards in Activity 1. You should be comfortable with how the various results described in Visuals 2 and 3 were obtained.

1. Point out that people make choices all of the time. Their choices are made by weighing the benefits and costs of alternatives and selecting the alternative that has the greatest benefits relative to the costs.

2. Explain that it is important to consider the opportunity cost. Opportunity cost is the highest valued forgone alternative when a choice is made.

3. Relate the following scenario to the class: An advertisement for a new home exercise machine that sells for \$395 poses the question, "Isn't \$395 a small price to pay for a stronger and healthier body?" Discuss the following.

- A. Does \$395 really represent the total cost in this situation? (No.)
- B. What must be given up in order to have "a stronger and healthier body" assuming that the machine actually works? (The monetary cost is important because the individual gives up other goods that could have been purchased with the \$395. Other important costs include giving up the space to store and use the machine and the time spent on other enjoyable activities given up to use the machine.)

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Note that many exercise machines sit idle when the time costs associated with their use become apparent to the buyer. Thus, many people make purchases that they later discover they shouldn't have, given all the costs involved. They are out \$395 and never get that promised body!

4. Point out that in the United States today many people are concerned about the costs our economic activity imposes on the environment. Some people argue that pollution is the result of the profit motive. They think that a system based on profit seeking ignores environmental costs and, as with the exercise machines, results in poor decisions being made.

5. Explain that the class will investigate this proposition for both market economies and centrally planned nor command economies, such as that of the former Soviet Union.

6. Display Visual 1 and explain that widgets are a good that yields great satisfaction to society. As with all goods, resources must be used to produce widgets. However, there is more than one way to produce widgets because different technologies may be used and it is possible to substitute one resource for another. This table illustrates four different ways to produce widgets and the amount of resources required to produce one widget in each case.

7. Explain that students will be given some additional information and will be asked to select the "best" production method in two different situations.

8. Divide the class into four groups: Blue, Red, Yellow, and Green.

9. Give each student in each group a copy of the role card for that group. Instruct each group to select a reporter.

10. Allow ten minutes for the groups to discuss and decide which techniques they would choose.

11. Ask the reporter for the Blue group to read the group's role card and report its decision.

12. Ask the reporter for the Red group to report its decisions. Discuss any differences with respect to the Blue group. (There should be none. Both were given the same problem.) Display Visual 2 and explain the solutions found.

13. Ask the reporter for the Yellow group to read the group's role card and report its decisions.

14. Ask the reporter for the Green group to report its decisions. Discuss any differences with respect to the Yellow group. (There should be none. They were both given the same problem.) Display Visual 3 and explain the solutions found.

15. Discuss the following.

- A. What is the cost of using Resource D for all groups? (Zero. All are able to use unlimited amounts of Resource D for free.)
- B. When unlimited amounts of Resource D were not available for free, how did the groups respond? (They chose other options that required less of the relatively more expensive or less abundant Resource D.

16. Explain that in a market system, resource use and goods production are directed by the incentive to earn profit. In a command economy, resource use and goods production are determined by central planners who distribute resources and set output targets.

17. Point out that in this activity the Blue and Red groups represented entrepreneurs in a market system, while the Yellow and Green groups represented managers in a command system. Note to the students that both sets of groups reacted in a similar way to an increase in the cost of a resource — they both chose an alternative option to conserve (economize) on its use.

18. Ask students to imagine that Resource D represents air and waterways used to dump

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production waste (air and water pollutants). Discuss the following.

- A. In what sense have these resources been treated as “free” to use for the disposal of wastes in the past? (No one owned them or managed their use. Everyone was free to use them as they wanted and as much as they wanted.)
- B. Is there, in fact, a cost associated with using these resources as disposal sites; that is, is something given up? (Yes, people must give some environmental quality, such as loss of visibility, loss of wildlife habitats, loss of aesthetic beauty, and loss of good health.)
- C. Why might a market system fail to take this cost into account? (It is difficult to define private ownership of these resources. Thus, there are no “suppliers” of the services of these resources to consider the consequences of how they are used. For example, suppose that a lake is owned by Mindy. If Clark is willing and able to pay \$1000 to Mindy to have her keep the lake “clean” for aesthetic and fishing reasons, then the cost to Mindy of selling the lake as a dump site for wastes would be \$1000. That would be the value of her foregone opportunity. She would not take less than \$1000 (her cost) to use the lake as a dump site. In other words, she considers the cost consequences of her decisions and this cost is reflected in the price she would charge for using the lake as a dump site. Without an owner, this doesn’t happen.)
- D. Why might a command system fail to take this cost into account? (Environmental quality may not be seen as a valued good by central planners, so the unlimited use of air and waterways is seen as costless — nothing of value is given up.)
- E. What does this suggest needs to be done in both systems? (The relative scarcity or cost

of using air and waterways must be accounted for in both systems. This means putting a price on using them in a market system, such as emission charges/taxes or creating a market for permits to emit. For a command system, it requires that central planners view environmental quality as a valued good which may be foregone if no resources are devoted to its “production.” Thus, they may need to place restrictions on the amount of allowable emissions to reduce their use of air and waterways as dump sites.)

### CLOSURE

1. Remind students that environmental problems in both market and command systems occur because the real cost of resource use is ignored.
2. Discuss the following.
  - A. In a command economy, central planners essentially take stock of the available resources in the economy and then allocate them to those goods and services that they deem most important. Given the relatively low standard of living in the former Soviet republics, why might the Soviet planners have allocated so few resources to preserving (producing) environmental quality? (They likely measured the success of their efforts in terms of the production of traditional economic goods, such as food, clothing, shelter, and capital — not in terms of less traditional measures, such as air and water quality and habitat preservation. Note that by ignoring these environmental goods, they ignored part of the cost of producing the traditional goods — the lost environmental quality.)
  - B. Why might new leaders in the former Soviet republics be reluctant to implement policies that take these costs into account? (They may be eager to achieve economic success as measured by the production of traditional goods. By ignoring these costs, more

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traditional goods can be produced at the expense of environmental quality.)

- C. Why might the leaders in market economies be slow to implement policies that take these costs into account? (Because it will increase the cost of producing most goods and services and, thus, increase prices for consumers. It is important to note, however, that these higher prices would lead to lower quantities of goods demanded and higher levels of environmental quality as resources would be diverted away from the production of traditional goods, leading to less resource use and less waste generation.)

### ASSESSMENT

1. During the last twenty years, the U.S. government legislated the use of catalytic converters and unleaded gasoline. Ask students to write an essay explaining why this legislation was enacted, what the impact was on the cost of driving and the cost of using air.

2. Have students take a particular resource-use issue, such as spotted owl habitat versus logging, wilderness preservation versus mining, or scenic canyon preservation versus building a hydroelectric facility. Have them describe the opportunity cost of each development option and the opportunity cost of each environmental option. Have them discuss which of these costs would be easier to quantify and explain why.

3. Instruct students to investigate environmental problems in South American countries and explain why environmental costs may be ignored by the citizens of these countries when producing traditional goods and services (housing, food, clothing).

4. Have students investigate how the central planners of the former Soviet Union measured their success; that is, what were their goals/objectives?

### EXTENSION

1. See Lessons 1-20 in *Economics and the Environment*, National Council on Economic Education. 1996.

2. Instruct students to produce an "Environmental Report Card" for their state and one of the newly emerging independent states of the former Soviet Union. They should collect information/data on water quality, air quality, habitat preservation, hazardous waste sites, and ground water contamination.

3. Ask students to suggest methods of reflecting environmental costs in the decisions made by producers (and consumers). In particular ask them to investigate the emission charges/taxes used in some European nations, the SO<sub>2</sub> emissions permit market created by the Clean Air Act of 1990 in the United States, or garbage collection systems that charge by the weight of a consumer's garbage, or recycling programs that offer rewards to consumers who return bottles, cans, and other wastes.

4. See "Soviet Pollution," *National Geographic*, Vol. 186, No. 2, August 1994, pp. 70-99.

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# VISUAL 1

## WIDGET PRODUCTION

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Resources Required to Produce One Widget	Alternative Production Options			
	(1)	(2)	(3)	(4)
Units of Resource A	1	2	4	5
Units of Resource B	5	3	2	1
Units of Resource C	4	4	3	3
Units of Resource D	5	4	2	1

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# VISUAL 2

## WIDGET PRODUCTION ANSWERS

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When the price of Resource D is \$0 per unit, the Blue and Red groups should choose Option 2 because it results in the lowest cost per widget and the most profit.

<b>Option 2:</b>	2 units of Resource A @ \$50	=	\$200
	3 units of Resource B @ \$40	=	\$120
	4 units of Resource C @ \$20	=	\$ 80
	4 units of Resource D @ \$0	=	<u>\$ 0</u>

TOTAL            \$300

Options 1, 3, and 4 cost \$330, \$340, and \$350 respectively.

When the price of Resource D is \$50 per unit the Blue and Red groups should choose Option 4 because now it results in the lowest cost per widget.

<b>Option 4:</b>	5 units of Resource A @ \$50	=	\$250
	1 units of Resource B @ \$40	=	\$ 40
	3 units of Resource C @ \$20	=	\$ 60
	1 units of Resource D @ \$50	=	<u>\$ 50</u>

TOTAL            \$400

Options 1, 2, and 3 cost \$580, \$500, and \$440 respectively.

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### VISUAL 3

## WIDGET PRODUCTION ANSWERS

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When the use of Resource D is unlimited, the Yellow and Green groups should choose Option 1 as it allows them to produce the most output from the resources available to them.

<b>Option 1:</b>	Resource A	$\frac{60}{1}$ units	=	60 widgets possible
	Resource B	$\frac{200}{5}$ units	=	40 widgets possible
	Resource C	$\frac{160}{4}$ units	=	40 widgets possible
	Resource D	unlimited	=	unlimited widgets

The most widgets possible using options 2, 3, and 4 are 30, 15, and 12 units respectively. Note that while Resources B and C constrain output to 40 for Option 1, it is the amount of Resource A that constrains output for the other options.

When the amount of Resource D available is limited to 40 units, the Yellow and Green groups should choose Option 3 because not it allows for the most output.

<b>Option 3:</b>	Resource A	$\frac{60}{4}$ units	=	15 widgets possible
	Resource B	$\frac{200}{2}$ units	=	100 widgets possible
	Resource C	$\frac{160}{3}$ units	=	50 widgets possible
	Resource D	$\frac{40}{2}$ units	=	20 widgets possible

The most widgets possible with options 1, 2, and 4 are 8, 10, and 12 units respectively. Note that Resource A still constrains output for Options 3 and 4, but now Resource D constrains output for Options 1 and 2.

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# ACTIVITY 1

## ROLE CARDS

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### BLUE GROUP

You and the other members of your group are owners of a widget factory. There are four different ways you can use to produce widgets. Assuming that your goal is to maximize your profits, select the best technique to use given the following resource prices:

Resource A	\$50 per unit
Resource B	\$40 per unit
Resource C	\$20 per unit
Resource D	\$ 0 per unit

Suppose next that the price of Resource D rises to \$50 per unit. Which technique would you choose now?

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### RED GROUP

You and the other members of your group are owners of a widget factory. There are four different ways you can use to produce widgets. Assuming that your goal is to maximize your profits, select the best technique to use given the following resource prices:

Resource A	\$50 per unit
Resource B	\$40 per unit
Resource C	\$20 per unit
Resource D	\$ 0 per unit

Suppose next that the price of Resource D rises to \$50 per unit. Which technique would you choose now?

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### ACTIVITY 1

### ROLE CARDS (continued)

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#### YELLOW GROUP

You and the other members of your group are the managers of a widget factory. There are four different ways you can use to produce widgets. Assuming your goal is to maximize the amount of widgets you produce, select the best technique to use given that you have the following stocks of resources available to you:

Resource A	60 units
Resource B	200 units
Resource C	160 units
Resource D	Unlimited amounts

(Note that your production will be constrained by the least available resource.)

Suppose next that the amount of Resource D available for you to use is reduced to 40 units. Which technique would you choose now?

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#### GREEN GROUP

You and the other members of your group are the managers of a widget factory. There are four different ways you can use to produce widgets. Assuming your goal is to maximize the amount of widgets you produce, select the best technique to use given that you have the following stocks of resources available to you:

Resource A	60 units
Resource B	200 units
Resource C	160 units
Resource D	Unlimited amounts

(Note that your production will be constrained by the least available resource.)

Suppose next that the amount of Resource D available for you to use is reduced to 40 units. Which technique would you choose now?

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